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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,714	03/21/2001	Solomon Davidovich Labinov	6321-194	3357

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Gregory A. Nelson
AKERMAN, SENTERFITT & EIDSON, P.A.
222 Lakeview Avenue, Suite 400
P.O. Box 3188
West Palm Beach, FL 33402-3188

EXAMINER

DUONG, THANH P

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/813,714

Applicant(s)

LABINOV ET AL.

Examiner

Tom P. Duong

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 88-102 is/are pending in the application.
- 4a) Of the above claim(s) 103 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 88-102 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 88, 90-91, 94-99, and 100-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over La Pierre et al. (6,348,278) in view of Micheli et al. (5,449,568). Note, the system is being examined as an apparatus. Regarding claims 88, 94-95, 97, and 101, La Pierre discloses a system for converting fuel energy to electricity (Fig. 2), comprising: a reformer (12) for converting a higher molecular weight gas (hydrocarbon, Col. 7, lines 14-18 and methane gas, Col. 7, line 36) into at least one mixed gas stream of lower average molecular weight (Col. 8, lines 46-51) comprising at least a first lower molecular weight gas (H₂) and a second gas (CO) said first and second gases being different gases; a separator (14) for dividing said mixed gas stream into a first gas stream mainly comprising said first lower molecular weight gas (via line 40) and a second gas stream mainly comprising said second gas (CO); the first gas (purified hydrogen via line 40) is fed to the fuel cell 52 to produce electricity (64); and the retentate stream is fed to the turbines (45,47). La Pierre fails to disclose a second fuel

cell for electrochemically oxidizing said second gas stream to produce electricity. It appears La Pierre discloses at least one turbine to produce electricity from expansion of said mixed gas (Figure 2, (45) and (47)). Micheli '568 teaches the second gas stream separated from the CO₂ separator (44) is fed to the fuel cell (14) to produce electricity (39) and at least one turbine (64, 68) from expansion of said mixed gas to produce electricity (66, 70, 28). Thus, it would have been obvious in view of Micheli '568 to one having ordinary skill in the art to modify the fuel converting system of La Pierre with a second fuel cell and at least one turbine as taught by Micheli '568 to produce electricity. Note, the method of feeding the mixed gas stream to a turbine prior to feeding the mixed gas to the separator does not differentiate the claimed apparatus from the prior art if the prior art apparatus teaches all the structural limitations of the claim. See *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Regarding claims 90 and 96, both references (La Pierre, Col. 2, lines 1-5 and Micheli, Col. 5, lines 1-5) disclose various types of fuel cells including the use of solid oxide fuel cell in the system and it would have been obvious to one having ordinary skill in the art to use both fuel cells with solid oxide fuel cells or any other equivalent fuel cells since it is art-recognized that substituting equivalents for the same purpose is obvious over the prior art. See *In re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958). Regarding claim 91, La Pierre discloses a portion of the heat (recycled fuel cell water vapor 80) to the reformer 12 to improve energy efficiency usage in the system (Col. 12, lines 17-34 and Col. 2, lines 60-65). Regarding claim 94, La Pierre discloses the pressurized hydrocarbon (high molecular weight gas) stream is delivered to the reforming reaction zone (Col. 6, lines

49-52). Regarding claim 95, La Pierre discloses the high molecular weight gas contains methane (Col. 16, lines 35-38) and is reformed by a reformer 12 to produce a first low molecular weight gas, H₂ and a second low molecular weight gas, O₂ (Col. 1, lines 30-49). Regarding claim 98, La Pierre discloses the output streams from the fuel cell 52 are supplied to the combustor 94 via line 92. Regarding claim 99, La Pierre discloses an air supply (74) to the fuel cell 52 and Micheli discloses air supply 47 to the fuel cell 14. With respect to the supplied air to first CO fuel cell prior to H₂ fuel cell, it would have been obvious to one having ordinary skill in the art to provide an air supply line to each fuel cell or a single air supply line cascading to a series of fuel cells to reduce piping cost. In addition, the order of supply air to various fuel cells lacks patentable weight in an apparatus claim. Note, the manner of operating the device does not differentiate apparatus claim from the prior art if the prior art apparatus teaches all the structural limitations of the claim. (See *Exparte Masham*, 2 USPQ2D 1647 (BD. Pat. App. & Inter. 1987). Regarding claim 100, it is conventional to provide an air separation device to separate oxygen from other gas mixture and it would have been obvious to do so here to produce a enriched oxygen stream to facilitate the oxidation reaction in the fuel cell. Regarding claim 102, the recitation of "natural gas supplied to said reformer at a pressure of at least approximately 40 atmospheres" does not further impart structurally limitation to the claimed invention and therefore, such recitation lacks patentable weight in an apparatus claim. Note, the manner of operating the device does not differentiate apparatus claim from the prior art if the prior art apparatus

teaches all the structural limitations of the claim. (See *Exparte Masham*, 2 USPQ2D 1647 (BD. Pat. App. & Inter. 1987).

2. Claim 89 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (La Pierre et al. '278 in view of Micheli '568) as applied to claim 88 above, and further in view of Burchell et al '716. The applied references disclose any type of hydrogen separating membrane may be used to separate hydrogen from the other reaction products in the reformat stream (Col. 8, lines 56-58) but fail to disclose the separator is a carbon fiber composite molecular sieves (CFCMS). Burchell teaches the use of a CFCMS separator (Col. 3, lines 4-20) to separate the hydrogen from the carbon monoxide and other gas mixtures (Col. 5, lines 45-52). Thus, it would have been obvious in view of Burchell to one having ordinary skill in the art to substitute the hydrogen separating device of La Pierre with a CFMS separator as taught by Burchell to provide an alternative separation device for separating hydrogen from carbon monoxide.

3. Claims 92 and 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (La Pierre et al. '278 in view of Micheli '568) as applied to claim 88 above, and further in view of Andrew (4,810,472). Regarding claims 92 and 93, the applied references fail to disclose a nuclear reactor for generating heat to heat a high molecular weight gas. Andrew teaches the product gas steam and reactants from the reformer can be heated by an external energy heat source such as a hot helium

nuclear reactor coolant (Col. 2, lines 15-21) if heat recovery is not available for the reformer. Thus, it would have been obvious in view of Andrew to one having ordinary skill in the art to modify the apparatus of the applied references with a nuclear reactor as taught by Andrew in order to provide a heat source to heat the product gas stream and reactants.

Response to Arguments

Applicants' arguments filed 11/9/05 have been fully considered but they are not persuasive. (1) Applicants argued the "difference in the claimed invention over the cited art that provides a significant increase in efficiency is that in the claimed inventive system the mixed gas stream (fuel stream) first goes to an expansion turbine for generation of electricity before being electrochemically oxidized". It is submitted that the applied references are capable of performing the intended function of feeding the mixed gas to the turbine for generation of electricity before being electrochemically oxidized. Note, the system is being examined as an apparatus; thereby, the manner of operating the device does not differentiate apparatus claim from the prior art if the prior art apparatus teaches all the structural limitations of the claim. (See *Exparte Masham*, 2 USPQ2D 1647 (BD. Pat. App. & Inter. 1987). (2) Applicants argued the applied references fail to disclose or suggest using the turbines to produce electricity. Examiner respectfully disagrees. The turbines 45 and 47 of La Pierre are capable of generating electricity. Micheli also discloses the separated gas (via line 46) from a reformer (41) is feed to the turbine 26 to produce electricity (28). Micheli also discloses the separated

gas is fed to the turbines 64 and 68 to produce electricity as shown in Figure. (3)

Applicants argued neither La Pierre nor Micheli disclose or suggest electrochemically oxidizing a second gas stream (retentate stream) to produce electricity. Examiner respectfully disagrees. LaPierre discloses the separated gas (purified hydrogen) is fed to the hydrogen fuel cell 52. Examiner agrees LaPierre fail to disclose a second fuel cell for electrochemically oxidizing said second gas stream (mainly CO₂) to produce electricity. Micheli teaches the second gas stream (via line 46) containing mainly CO₂ gas is fed to the CO₂ fuel cell (14) to produce electricity (39). Thus, it would have been obvious in view of Micheli to one having ordinary skill in the art to modify the apparatus of LaPierre with a CO₂ fuel cell as taught by Micheli in order to oxidize the second gas stream. (4) Applicant also argued the exhaust gas stream of Micheli is directed to the cathode of fuel cell 14 is electrochemically reduced, not electrochemically oxidized. Examiner respectfully disagrees. Micheli discloses the second gas stream of the claimed invention containing a high concentration of CO₂ and the gas stream is fed to the solid oxide fuel cell 14 of the claimed invention to produce electricity. Thus, one of ordinary skill in the art in view of the applied references would have expected the exhaust gas stream being electrochemically oxidized in the fuel cell 14. In addition, "apparatus claims cover what a device is, not what a device does". See *In re Schreiber and Hewlett-Packard Co. v. Baush & Lomb Inc.* MPEP 2114.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P. Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong
January 12, 2006





Glenn Cardarola
Supervisory Patent Examiner
Technology Center 1700